

Laparoscopic Resection of the Liver for Cancer

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KEYWORDS

- Laparoscopy • Liver Resection • Hepatic Resection • Metastatic colorectal cancer
- Hepatocellular carcinoma

KEY POINTS

- Laparoscopic hepatic resection has been most widely applied to patients with solitary and symptomatic benign tumors.
- Tumors in the segments II, III, IVb, V, and VI are more assessable for laparoscopic resection, whereas those in segments VII, VIII, and IVa are the most difficult to resect laparoscopically.
- Studies of carefully selected patients to date suggest less blood loss for laparoscopic hepatic resections, but concern over the rare but not infrequently reported occurrence of significant intraoperative hemorrhage from vascular injuries continues to warrant careful study.
- For selected patients with a solitary hepatocellular carcinoma, laparoscopic hepatic resection should be considered and seems to be associated with some advantages.
- For patients with metastatic colorectal cancer, laparoscopic hepatic resection should only be applied in cases that have adequate room between the tumor and the transaction plane to ensure an adequate margin.
- Detailed preoperative imaging and liberal use of intraoperative ultrasound are helpful adjuncts for assessing the residual hepatic parenchyma, especially when a hand-port device is not used.
- Ongoing randomized clinical trials coming open to laparoscopic resection of both metastatic colorectal lesions and hepatocellular carcinomas will certainly enhance the current understanding of the role of laparoscopic hepatic resection for cancer.

HISTORY OF LAPAROSCOPIC HEPATIC RESECTIONS

Gagner and colleagues¹ is credited with reporting the first laparoscopic hepatic resection in 1992. In an abstract presented at the Annual Meeting of the Society of American

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Gastrointestinal and Endoscopic Surgeons, he described 2 patients. The first was a young woman with a 6-cm lesion in segment VI, which was thought to be an adenoma, but after she underwent a laparoscopic wedge resection, it was found instead to be focal nodular hyperplasia. The second patient had metastatic colorectal cancer, and a wedge resection in segment V was undertaken. Both specimens were removed transvaginally and the patients were discharged within 4 days postoperatively.

The following year, the first report of a laparoscopic anatomic hepatic resection was published by Azagra and colleagues,² who described a left lateral sectionectomy (resection of segments II and III) for a symptomatic hepatic adenoma. Not until 4 years later in 1997 was the first major anatomic hepatic resection reported. Huscher and colleagues³ reported a series of 20 patients in which 6 patients underwent left hemihepatectomy, 5 underwent right hemihepatectomies, and 3 had central hepatectomies.

Although the Italian group had reported the abovementioned series of complex resections 3 years prior, a seminal publication in 2000 by Cherqui and colleagues⁴ is often credited as being the first reported series of laparoscopic hepatic resections. The group from the Hopital Henri Mondor in Paris reported 30 patients who largely underwent laparoscopic segmentectomies. This publication in the *Annals of Surgery* seemed to ignite the spark in many hepatic surgeons, and the laparoscopic approach to hepatic resections began to be used more widely. These authors chose to use laparoscopic approaches on patients with hepatocellular carcinoma (HCC), and excluded any patients with colorectal metastases.

EVOLUTION OF LAPAROSCOPIC HEPATIC RESECTIONS

Between 1997 and 2007, many case series of laparoscopic liver resections were published, but most of these included fewer than 30 patients. Things changed rapidly, however, in 2007 when a series of 300 laparoscopic liver resections was presented by Koffron and colleagues⁵ from Northwestern University at the American Surgical Association's Annual Meeting. This report was greeted with much skepticism, as reflected by the discussants questioning the applicability of the procedure to patients with cancer, its safety, and the method through which the technique could be disseminated safely. Despite the concern from senior surgeons, the following year at the same meeting, the group from Cincinnati presented a series of 500 minimally invasive hepatic procedures, which included 253 patients who underwent laparoscopic hepatic resection.⁶

Although these 2 series are still the largest single-center experiences published, many other groups began to publish their experience with laparoscopic liver resection. By the end of 2008, reports of nearly 3000 patients had been published in the worldwide literature. In a review of this literature, nearly half of the cases were undertaken for hepatic malignancies.⁷ Of those with malignant indications for resection, 52% had HCC, 35% had metastatic colorectal cancer, and 13% had other malignancies. Further, the trend was that of an exponentially increasing number of patients undergoing laparoscopic resections each year, with the fraction of those with malignant indications rapidly increasing.

THE LOUISVILLE STATEMENT

In 2008, Buell's⁸ group for the University of Louisville coordinated an international consensus conference to discuss the major issues in laparoscopic liver surgery. Approximately 300 attendees were present and a variety of important topics were addressed, some of which are summarized in the following list.

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